



Southern Forest Health Research and Management Update



Summer 2018

IN THIS ISSUE

- 1 Use of non-native wood by saproxylic insects
- 2 Eastern white pine workshop and initiative
- 2 SPB Road Shows shares knowledge with managers
- 3 Forest pathology at LTU
- 3 Andy Whittier completes thesis on teak nutrition
- 3 Undergraduate wins scholarship to study abroad



- 4 Asheville 6th graders learn about forest research
- 4 UGA students win presentation awards
- 4 Jim Meeker completes 15 years with FHP

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joint publication of:**

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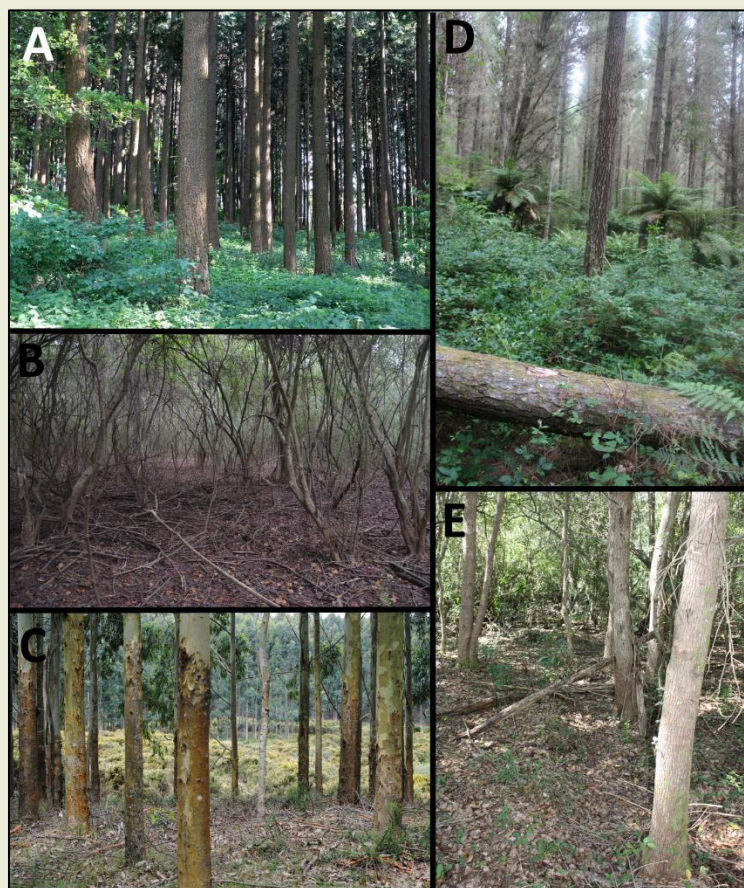
Science and Program Highlights

Utilization of non-native tree species by wood-dependent insects

Dying and dead wood produced by non-native trees and shrubs represent novel resources for saproxylic (wood-dependent) insects, but little is known about the suitability of these substrates to such insects. A new book chapter by SRS 4552 entomologists **Mike Ulyshen** and **Scott Horn**, along with other co-authors, explores this question by reviewing the existing literature and presenting several new case studies from the U.S., Germany, Portugal/Spain and New Zealand. It concludes that non-native wood species can support diverse insect assemblages but their suitability varies greatly depending on host species as well as the host specificity of the insect(s). In the southeastern U.S., for example, mimosa supported about as many beetle species as willow oak and sweetgum, whereas another non-native species, Chinese privet, supported the fewest species. Although many generalist species appear capable of using non-native woody resources, more research is needed to determine whether non-native wood species have any value in promoting the conservation of the most threatened taxa. For more information, contact: Michael Ulyshen (mulyshen@fs.fed.us).

*Examples of forests
dominated by non-native
woody plants:*

- A)** Douglas fir plantation
in Germany (M. Gossner);
B) Invasive Chinese privet
in Georgia, U.S.A.
(M. Ulyshen);
C) Eucalyptus plantation
in southern Brazil
(G. Overbeck);
D) *Pinus radiata*
plantation in New
Zealand (M. Ulyshen);
E) Invasive camphortree
in Mississippi, U.S.A.
(M. Ulyshen).



Eastern white pine health workshop leads to strategic national initiative

The 2018 USDA Agriculture and Food Research Initiative (AFRI) in White Pine Health in Eastern Timberlands (WHIET) Workshop and the 2018 USDA NIFA Multistate White Pine Health Meeting was held Feb. 6-9, 2018, in Athens, GA at Flinchum's Phoenix (of the Warnell School of Forestry and Natural Resources). Programming for the workshop was a collaboration between the Southern Research Station, Northeastern Area, and researchers at the University of Georgia and the University of Maine. Deans from both land-grant institutions opened the workshop, which included invited research papers and a field trip to affected eastern white pine stands in the Chattahoochee National Forest. The workshop enjoyed over 35 attendees from USFS Forest Health Protection, Region 8 and Region 9, state agencies from Maine to Georgia, along with university collaborators from the US and Canada. For more information, please contact Rima Lucardi (rlucardi@fs.fed.us).

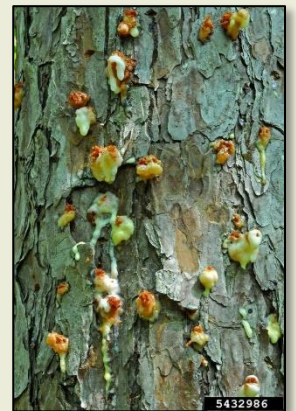


Field trip participants visited the Chattahoochee NF for hands-on identification of the novel insect-pathogen complex associated with eastern white pine dieback and mortality. Photo by R.D. Lucardi.

"Southern Pine Beetle Roadshow" shares knowledge with managers

The southern pine beetle (SPB) has returned to our region with a vengeance, highlighting the many changes that have occurred since our last outbreak. For a variety of reasons, the tools, tactics and options available to forest managers differ substantially from those used during previous outbreaks. Forest industry, digital technology, National Forests and timber markets all have evolved to produce a Brave New World for managing destructive forest pests on public lands. As we navigate this terrain, we appreciate the expertise and experience of retired, existing and detailing foresters, and their willingness to share their knowledge, skills, and abilities to assist current efforts. Current conditions, combined with new tools and approaches to managing outbreaks, has provided a tremendous learning experience and opportunities to interact with National Forests as they prepare for the possibility of increased SPB activity.

To capitalize on creative SPB management efforts that have taken place primarily on National Forests of Mississippi, seminars and trainings—dubbed the "SPB Roadshow"—were conducted throughout the region. National forests in Alabama, Arkansas, Georgia, Louisiana, and Texas worked with **Forest Health Protection** and **Forest Service Timber Sales** staff to produce and host the events. Strategies and tactics ranging from SPB biology and ecology to Cut and Leave to suppression/salvage sales preparation and use of evolving GIS and satellite imagery tools were highlighted. Thanks to everyone who has supported these efforts! For more information, please contact Brian Strom (brianstrom@fs.fed.us) or Jim Meeker (jirmeeker@fs.fed.us).



*SPB pitch tubes.
Photo: Erich Vallery.*

In the News

Forest Pathology field session at Louisiana Tech University

Rabiu Olatinwo, SRS Research Plant Pathologist (left photo below) conducted a Forest Pathology laboratory class/ field session with students at the School of Agricultural Science and Forestry, Louisiana Tech University (LTU), in Rustin, LA on April 25, 2018. Olatinwo was invited by LTU collaborators Dr. Paul Jackson (middle photo) and Dr. Joshua Adams (right photo), both standing next to dying oak trees on campus.



Andy Whittier completes M.S. degree on nutrient disorders of teak

Andy Whittier, affiliate employee in SRS 4552 and a research forester with NC State/ Camcore's Domestic Conservation Program, recently completed his M.S. degree, with a thesis titled "Nutrient Disorder Foliar Symptoms, Foliar Nutrient Levels, and Predictive Near-infrared Spectroscopy Nutrient Models of Teak (*Tectona grandis* L.f.)". Andy is located with our unit in Asheville, NC and works on a number of gene conservation projects as well as hemlock restoration and silviculture. Congratulations, Andy!



Undergraduate Research Assistant Wins Scholarship to Study Abroad in Costa Rica

Jarron Gravesande, a senior in Biological Sciences at the University of Georgia and research assistant to **Rima Lucardi** in SRS 4552, recently won multiple academic scholarships in the College of Agriculture at UGA. One scholarship supports a summer semester to study abroad at UGA's campus in Costa Rica. Jarron left on 22 May 2018, and is taking Tropical Ecology and completing his Spanish minor with this summer's practicum teaching both Spanish and English to grade school students. Prior to his departure, Jarron successfully completed the germination trials for research being conducted at the Port of Savannah on the prevention of invasive plant propagules. Jarron's main research interests include plant pathology, microbiology, and ecology. Congratulations, Jarron!

Asheville sixth graders learn about ecology and math in forest research



On May 30, SRS 4552 research entomologist **Bud Mayfield** and NCSU/Camcore research forester **Andy Whittier** spoke with about 90 enthusiastic 6th graders at A.C. Reynolds Middle School in Asheville, NC. The scientists shared about their research and the benefits of a career in the ecological sciences. They also presented results from current studies that illustrated concepts the students were learning in their math and ecology classes. The students thought carefully and creatively about the material, as evidenced by their excellent questions and comments during the Q&A. Thanks to all the students and teachers for such a rewarding interaction!

University of Georgia students win presentation awards at the GES-SCES Joint Meeting

Recent awardees at the 2018 Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society (April 4-6, 2018) included several **University of Georgia students connected to SRS 4552**. Congratulations to all these students for their excellent work!

- *T.L. Bissell Award* (MS and BS oral presentations). First Place: **Holly Munro** (co-advised by Brian Sullivan and Kamal Gandhi). Title: Electrophysiological and behavioral response of southern pine beetles to semiochemicals produced by sympatric black turpentine beetles.
- *C.M. Beckham Award* (PhD oral presentations): Second Place: **Thomas Whitney** (co-advised by Rima Lucardi and Kamal Gandhi). Title: The eastern white pine bark scale (Hemiptera: Matsucoccidae) and its association with tree dieback.
- *U.E. Brady Award* (Student poster presentation): First Place: **Conor Fair** (co-advised by Mike Ulyshen and Joseph McHugh). Title: Investigating the effects of prescribed burn size on pollinator communities in the Piedmont National Wildlife Refuge. Third Place: **Emilee Poole** (advised by Mike Ulyshen). Title: Understanding *Agrilus macer* (Coleoptera: Buprestidae) biology and its role in sugarberry (*Celtis laevigata*) mortality.

Jim Meeker completes 15 years with Forest Health Protection

My, how time flies! May 2018 marked 15 years of service for entomologist **Jim Meeker** with the Forest Health Protection Alexandria Field Office. He is pictured here (on right) receiving his service award from Field Office Representative Brian Strom. Jim came to FHP following 9 years of service with the Florida Division of Forestry Forest Health Section, where he honed his skills in southern pine beetle management. FHP is very lucky to have Jim, and hopes to have him for at least another 15 years! Congratulations, Jim!



Technology Transfer

Publications (in print/press):

1. Chase, K.D., L.D. Stringer, R.C. Butler, A.M. Liebhold, D.R. Miller, and E.G. Brockerhoff. In press. **Multiple-lure surveillance trapping for Scolytinae, Cerambycidae and brown marmorated stink bug.** J. Pest Sci.
2. Enloe, S.F., R.D. Lucardi, N.J. Loewenstein, D.K. Lauer. In press. **Response of twelve Florida cogongrass (*Imperata cylindrica*) populations to herbicide treatment.** Invasive Plant Sci. Manag.
3. Lapham, M., C.F. Miniati, A.E. Mayfield III, R.M. Jetton, S.T. Brantley, D.R. Zietlow, C. Brown, and J.R. Rhea. In press. **Shade and hemlock woolly adelgid infestation increase eastern hemlock foliar nutrient concentration.** For. Sci. <https://doi.org/10.1093/forsci/fxy025>.
4. Miller, D.R., and C.M. Crowe. 2018. **Effects of distance between baited multiple-funnel traps on catches of bark and wood boring beetles in north-central Georgia.** J. Entomol. Sci. 53: 268-277.
5. Miller, D.R., C.M. Crowe, M.D. Ginzel, C.M. Ranger, and P.B. Schultz. In press. **Comparison of baited bottle and multiple-funnel traps for ambrosia beetles (Coleoptera: Curculionidae: Scolytinae) in eastern USA.** J. Entomol. Sci. (in press).
6. Olatinwo, R., S. Walters, and B. Strom. 2018. **Impact of *Beauveria bassiana* (Ascomycota: Hypocreales) on the Small Southern Pine Engraver (Coleoptera: Scolytidae) in a Loblolly Pine Bolt Assay.** J. Entomol. Sci. 53(2): 180-191. 2018. <https://doi.org/10.18474/JES17-58.1>.
7. Schelhas, J., T. Cabe, A. Walker, A. Mayfield, and B. Spatola. In press. **Significant Trees of the Eastern Cherokee** (youth education module). Eastern Band of Cherokee Indians, Boys and Girls Club of American, and USDA Forest Service Southern Research Station.
8. Schulz, A.N., A.M. Mech, C. Asaro, D.R. Coyle, M.M. Cram, R.D. Lucardi, and K.J.K. Gandhi. 2018. **Assessment of abiotic and biotic factors associated with eastern white pine (*Pinus strobus* L.) dieback in the southern Appalachian Mountains.** For. Ecol. Manage. 423: 59-69. <https://doi.org/10.1016/j.foreco.2018.02.021>.
9. Schulz, A.N., A.M. Mech, M.M. Cram, C. Asaro, D.R. Coyle, R.D. Lucardi, S. Lucas, and K.J.K. Gandhi. 2018. **Association of *Caliciopsis pinea* Peck and *Matsucoccus macrocitrices* Richards with eastern white pine (*Pinus strobus* L.) seedling dieback.** For. Ecol. Manage. 423: 70-83. <https://doi.org/10.1016/j.foreco.2018.03.013>.
10. Ulyshen, M.D. (ed.) 2018. **Saproxylic Insects: Diversity, Ecology and Conservation.** Springer. 904 pp.
11. Ulyshen, M.D. 2018. **Ecology and conservation of Passalidae.** In: Ulyshen MD (ed) Saproxylic Insects: Diversity, Ecology and Conservation. Springer, pp. 129-147.
12. Ulyshen, M.D. 2018. **Saproxylic Diptera.** In: Ulyshen MD (ed) Saproxylic Insects: Diversity, Ecology and Conservation. Springer, pp 167-192.
13. Ulyshen, M.D., S. Pawson, M. Branco, S. Horn; E.R. Hoebeke, and M.M. Gossner. 2018. **Utilization of non-native wood by saproxylic insects.** In: Ulyshen MD (ed) Saproxylic Insects: Diversity, Ecology and Conservation. Springer, pp 797-834.

14. Ulyshen, M.D., and J. Šobotník. 2018. **An introduction to the diversity, ecology and conservation of saproxylic insects.** In: Ulyshen MD (ed) Saproxylic Insects: Diversity, Ecology and Conservation. Springer, pp 1-47.
15. Whitney, T.D., M.M. Cram, B.F. Barnes, J. Yao, R.D. Lucardi, and K.J.K. Gandhi. 2018. **Tree-level distribution of a novel insect-pathogen complex and its potential contribution to eastern white pine dieback.** For. Ecol. Manage. 423: 49-58. <https://doi.org/10.1016/j.foreco.2018.02.002>.
16. Zomlefer, W.B., J.R. Comer, R.D. Lucardi, J.L. Hamrick, and J. Allison. In press. **Distribution of the rare plant *Veratrum woodii* (Liliales: Melanthiaceae) in Georgia: A preliminary study with AFLP fingerprint data.** Syst. Bot.

Submitted Publications (in review):

1. A.E. Mayfield III, C. Villari, J.L. Hamilton, J. Slye, W. Langston, K. Oten, and S.W. Fraedrich. **First report of laurel wilt disease caused by *Raffaelea lauricola* on sassafras in North Carolina.** Plant Dis.
2. Schulz, A.N., R.D. Lucardi, and T.D. Marsico. **Successful invasion and failed biocontrol: Natural enemies' role. A Research Review.** Biol. Invasions.

Presentations and Lectures:

1. Barnett, J., R. Olatinwo, and P. Jackson. 2018. **Longleaf Pine Hybridization: Is there a growing problem?** Western Gulf Forest Tree Improvement Program (WGFTIP). Presentation at the Contact Representative meeting, May 30-31, 2018, Alexandria, LA.
2. Fair, C., S. Horn, J. McHugh, and M. Ulyshen. 2018. **Investigating the effects of prescribed burn size on pollinator communities in the Piedmont National Wildlife Refuge.** Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society, 4-6 Apr 2018, Helen, GA.
3. Jetton, R.M., and A.E. Mayfield. 2018. **Target-tree release to improve the sustainability of eastern hemlock in the eastern United States.** Southern Appalachian Forest Entomology and Pathology Seminar, 16 Mar 2018, Crossnore, NC.
4. Lucardi, R.D. 2018. **What is cogongrass and how worried should we be?** Arkansas-Oklahoma-Texas State Line Meeting 2018. 28 February 2018. Oklahoma City, OK.
5. Lucardi, R.D., K.S. Burgess, T.D. Marsico, C.E. Cunard, L.E. Whitehurst, J.K. Gravesande, J.N. Reed, and S.J. Worthy. 2018. **Federal Noxious Weed and non-native plant prevention from establishment and spread in the United States: A preliminary study at the Port of Savannah.** Savannah-Area Pest Risk Committee Meeting. US Customs and Border Protection, Dep. Homeland Security, LSS Laboratory. 11 April 2018. Savannah, GA.
6. Lucardi, R.D., T.D. Whitney, and K.J.K. Gandhi. 2018. **Biogeographical implications and anthropogenic impacts in the post-Columbian era on eastern white pine genetic diversity and resilience.** USDA-AFRI White Pine Health in Eastern Timberlands (WHIET Workshop) and USDA-NIFA Multistate White Pine Health Meeting. February 2018. Athens, GA.

7. Mayfield, A.E. 2018. **Vascular wilt diseases**. Invited guest lecture to course FOR 430 Forest Health and Protection, North Carolina State University, 11 Apr 2018, Raleigh, NC.
8. Mayfield, A.E., and R.M. Jetton 2018. **Hemlock silviculture and restoration in the southern Appalachians**. Northeastern Forest Pest Council Meeting, 14 Mar 2018, Burlington, VT.
9. McNichol, B., B. Sullivan, J.T. Nowak, B. Barnes, C. Villari, and K. Gandhi. 2018. **Regional phenotypic variation in southern pine beetle populations**. Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society, 4-6 Apr 2018, Helen, GA.
10. Munro, H.L., B.T. Sullivan, B.F. Barnes, C.R. Montes, J.T. Nowak, W.P. Shepherd, C. Villari, and K.J.K. Gandhi. 2018. **Electrophysiological and behavioral response of southern pine beetles to semiochemicals produced by sympatric black turpentine beetles**. Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society, 4-6 Apr 2018, Helen, GA.
11. Poole, E., M. Ulyshen, and S. Horn. **Understanding *Agilus macer* (Coleoptera: Buprestidae) biology and its role in sugarberry (*Celtis laevigata*) mortality**. Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society, 4-6 Apr 2018, Helen, GA.
12. Sheehan, T.N., M.D. Ulyshen, S. Horn, and E.R. Hoebeke. 2018. **Vertical stratification of bark and wood boring beetles at the forest edge and forest interior: is there an optimal trap location for detection?** Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society, 4-6 Apr 2018, Helen, GA.
13. Sweeney, J., P. Silk, P. Mayo, R.P. Webster, D. Miller, C. Hughes, J.M. Gutowski, T. Mokrzycki, M. Qingfan, L. Yan , J. Francese, and D. Rassati. 2018. **Improved trapping tools for surveillance of beetles moved in solid wood packaging**. 28th USDA Interagency Research Forum on Invasive Species, Jan 2018, Annapolis MD.
14. Whitney, T.D., R.D. Lucardi, and K.J.K. Gandhi. 2018a. **First glimpse into the continental-wide population structure and genetic diversity of the eastern white pine bast scale (*Matsucoccus macrocitrices* Richards)**. USDA-AFRI White Pine Health in Eastern Timberlands (WHIET Workshop) and USDA-NIFA Multistate White Pine Health Meeting. February 2018. Athens, GA.
15. Whitney, T.D., R.D. Lucardi, and K.J.K. Gandhi. 2018b. **The eastern white pine bast scale (Hemiptera: Matsucoccidae) and its association with tree dieback**. Joint Meeting of the Georgia Entomological Society and the South Carolina Entomological Society, 4-6 Apr 2018, Helen, GA.

USDA Forest Service

Forest Health Protection, Southern Region

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